



Adolescent Pregnancy Neonatal Birth Outcomes: A Single-Center Retrospective Cohort Study

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Abstract

Introduction: Adolescent pregnancies, which directly influence adolescent health, are considered high-risk pregnancies due to poor maternal and fetal outcomes. In this study, we aimed to investigate the effects of adolescent pregnancies, which are a global problem, on early newborn health and to raise awareness about adolescent pregnancies.

Methods: This study was designed as a retrospective, cross-sectional, single-center study. Newborns of 94 adolescent mothers aged 10–19 who gave birth between January 2021 and January 2022 were included in the study. Newborns of 106 non-adolescent (young adult) mothers aged 20–24 who gave birth during the same period were included in the control group. Anthropometric measurements, demographic data, early morbidity and mortality rates, diagnostic information, and hospitalization data of the babies in both groups were obtained retrospectively from electronic file records.

Results: During the study period, 6.62% (n=94) of 1419 women who gave birth in our hospital were in the adolescent age group, and 7.47% (n=106) were in the young adult age group. Gestational weeks at birth, rates of hospitalization in the neonatal unit, Apgar scores, and mortality and morbidity rates of infants of adolescent mothers were similar to those of young adult mothers ($p>0.05$). The median birth weight of infants of adolescent mothers was 3060 g (645–4085), which was significantly lower than the 3210 g (688–4410) median birth weight of infants of non-adolescent mothers ($p=0.003$). The frequency of small for gestational age (SGA) infants born below the 10th percentile for gestational age was 14.9% in adolescent mothers, while only 3% of infants of young adult mothers were born SGA ($p=0.003$).

Discussion and Conclusion: Adolescent pregnancies are considered high-risk pregnancies. In terms of maternal and neonatal health, close follow-up of adolescent pregnancies in both the early and late periods can help prevent possible complications.

Keywords: Adolescent pregnancy; newborn health; small for gestational age.

The adolescent period is defined as the transition period from childhood to adulthood in the process of psychological and social change between the ages of 10–19 [1]. Even though the somatic and psychological development of adolescent individuals is not yet mature, they become fertile with menarche, and pregnancy-related risks may occur with increasing frequency. When assessed from a multidisciplinary perspective including education,

health, economy, sociology, and law, adolescent pregnancies are classified as high-risk pregnancies [2]. Since the growth and maturation of pregnant adolescents are still ongoing, their reserves are low. The nutritional needs of adolescents increase with the growth of the fetus, puerperium, and breastfeeding in the postnatal period [3]. The risks of both adolescence and pregnancy are reflected onto the mother and the newborn. Adolescent

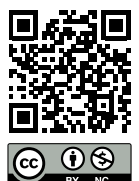
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pregnancies are associated with maternal risks including maternal anemia, eclampsia, and maternal death, as well as neonatal risks including preterm birth, low birth weight, and perinatal mortality [2–6]. The ability of the adolescent mother to cope with the problems she will encounter in the early neonatal period is not yet adequate. In addition, lack of support from a partner and family poses a significant threat to the health of the newborn. The anticipated risks can be reduced if these adverse conditions are improved with close antenatal monitoring and support of the adolescent mother [7,8].

In this study, we aimed to investigate the effects of adolescent pregnancies, which are a global problem, on early newborn health and to raise awareness about adolescent pregnancies.

Materials and Methods

Study Design and Setting

This study was designed as a retrospective, cross-sectional, single-center study. It was conducted in a tertiary city hospital in Istanbul, Türkiye, where approximately 2000 babies are born per year, between January 2021 and January 2022. The study was approved by the Clinical Research Ethics Committee of Istanbul Medeniyet University Goztepe Education and Research Hospital (Registration No: 2023/0959, date: 20.12.2023). It complied with the principles of the Declaration of Helsinki and Good Clinical Practice.

Participants

The study group included infants of adolescent mothers aged 10–19 who gave birth during the study period, and the control group included infants of young adult mothers aged 20–24. Anthropometric measurements, demographic data, early morbidities, diagnostic information, and hospitalization data of infants in both groups were obtained retrospectively from electronic file records. Newborns were categorized into subgroups according to gestational week. Those born at ≥ 37 weeks of gestation were classified as term, 34–36 weeks as late preterm, 32–33 weeks as moderate preterm, 28–<32 weeks as very preterm, and <28 weeks as extremely preterm [9]. A newborn whose weight was <10th percentile for gestational age was defined as small for gestational age (SGA) [10].

Statistical Analysis

SPSS software version 20.0 (Statistical Packages for Social Sciences: SPSS Inc., Chicago, IL, USA) was used

for all statistical analyses in the study. Demographic data and distribution of diagnoses were analyzed with descriptive methods. Continuous variables with a normal distribution were presented as mean $\pm$ standard deviation, while those without a normal distribution were expressed as median and interquartile range (IQR). The Kolmogorov–Smirnov test was used to assess the normality of distribution. In comparisons between adolescent and non-adolescent mothers, an independent samples t-test was used for continuous variables with a normal distribution, while the Mann–Whitney U test was applied for those without a normal distribution. For categorical variables, if the frequency in the cells was <5, Fisher's exact test was applied instead of the chi-square test. A p-value of <0.05 was considered statistically significant.

Results

During the study period, 6.62% (94/1419) of the 1419 women who gave birth in our hospital were in the adolescent age group, and 7.47% (106/1419) were in the young adult age group. Study findings revealed that young adult mothers gave birth more frequently than adolescent mothers ($p=0.001$). There was no significant difference in gestational age between the babies of adult and adolescent mothers ($p=0.750$). The rate of spontaneous vaginal delivery was found to be 63.8% (60/94) among adolescent mothers, whereas it was 48.1% (51/106) among adult mothers ($p=0.071$). Demographic data of mothers, including age, number of pregnancies, and nationality, are presented in Table 1.

When the infants of adolescent mothers were compared with those of young adult mothers in terms of neonatal unit admission frequency and mortality rates, no significant difference was found between the groups ($p=0.860$). In both groups, the cause of mortality was extreme prematurity, as the infants were born at <24 weeks of gestational age. The most common reasons for neonatal hospitalization were similar across groups and included indirect hyperbilirubinemia, inadequate feeding, and abnormal weight loss. Apgar scores of infants of adolescent mothers were similar to those of young adult mothers ($p=0.240$).

The median birth weight of infants of adolescent mothers was 3060 g (645–4085), which was significantly lower than the 3210 g (688–4410) median birth weight of infants of non-adolescent mothers ($p=0.003$). The frequency of

Table 1. Obstetric and perinatal characteristics of adolescent and adult pregnant women

Characteristics	Study group n=94	Control group n=106	p
Maternal age year	18 (14-19)	20 (22-24)	0.001**
Gestation	1 (1-4)	2 (1-5)	0.001*
Gestational age at birth weeks	39.4 (25.1-42.1)	39.5 (25-42.1)	0.75**
Ethnic group n (%)			0.88***
Turkish	86 (91.5)	93 (93)	
Syrian	7 (7.4)	5 (5)	
Other	1 (1.1)	2 (2)	
Mode of delivery vaginal n (%)	60 (63.8)	51 (48.1)	0.071

The values are given as medians (25th to 75th percentiles); Pearson's chi-squared test, *p<0.05 systatistically significant, ***Fisher exact test; **Mann-Whitney U test; Numbers in bold indicate statistically significant values.

Table 2. Early neonatal period outcomes of infants of adolescent and adult mothers

Newborn outcomes	Study group n=94	Control group n=106	p
Apgar score ≥ 7 n (%)	84 (89.4)	94 (94)	0.240
Birth weight [†] gr	3060 (645-4085)	3210 (688-4410)	0.003**
Sex female n (%)	45 (47.87)	48 (45.28)	0.980
SGA (%)	14 (14.89)	3 (2.83)	0.003***
Admission to NICU n (%)	14 (14.89)	14 (13.2)	0.860
Mortality rate n (%)	1 (1.06)	1 (0.94)	0.960***

NICU: Neonatal intensive care unit, SGA: Small gestational age; [†]The values are given as medians (25th to 75th percentiles); Pearson's chi-squared test, *p<0.05 systatistically significant **Mann-Whitney U test; ***Fisher exact test; Numbers in bold indicate statistically significant values.

small for gestational age (SGA) infants born below the 10th percentile for gestational age was 14.9% (14/94) in adolescent mothers, while only 2.8% (3/106) of infants of young adult mothers were born SGA (p=0.003) (Table 2).

Discussion

The largest adolescent population in world history is living today. The vast majority of this population consists of 1.2 billion girls and boys between the ages of 10–19 living in low- or middle-income countries [11,12]. Therefore, the economic, social, and political development of countries is closely related to the physical and mental health of adolescents [13]. Adolescent pregnancies, which directly influence adolescent health, are associated with poor maternal and fetal outcomes. In this cross-sectional study, we compared infants of adolescent mothers aged ≤ 19 and infants of young adult mothers in terms of early neonatal outcomes. We showed that infants in adolescent pregnancies were born with lower birth weights, and the incidence of SGA was higher.

Adolescent pregnancies are a major health problem in both developing and developed countries [14,15]. The

World Health Organization (WHO) prioritizes issues related to the management of adolescent pregnancies within the scope of the Millennium Development Goals [16]. Although the incidence has decreased due to the impact of comprehensive evidence-based projects and practices for prevention, adolescent pregnancies maintain their importance [7,16,17]. The prevalence of these pregnancies has been reported as 11% of all births worldwide [4]. Adolescent pregnancies are 3–4 times more common in low- and middle-income countries (LMIC) than in high-income countries. Poverty, difficulty in accessing healthcare services, lack of educational opportunities, gender inequality, and cultural practices regarding sexual health and marriage may explain the high incidence of adolescent pregnancies in LMIC [17–20].

Our country is among LMIC. According to the Türkiye Demographic and Health Survey, 12.1% of women have their first child before the age of 18. The adolescent fertility rate varies between regions, ranging from 3% in the Eastern Black Sea Region to 10% in Central Eastern Anatolia [21]. In this cross-sectional study conducted in a tertiary city hospital in Istanbul, the adolescent fertility rate was found

to be approximately 7%. Accordingly, it can be estimated that the incidence of adolescent pregnancy is even higher in real life. Istanbul is the most populous megacity in Türkiye and receives the most internal and external migration [22]. Therefore, we believe that the adolescent fertility rate we found reflects the national average.

In this study, we did not observe a correlation between the nationality of the pregnant women and the adolescent birth rate. An analysis assessing 65 studies from 12 countries in the literature reported that the pregnancy outcomes of immigrant women were poorer than those of native mothers [23]. The adolescent birth rate was found to be higher in Turkish immigrant women residing in the Netherlands than in the native-born population [24]. However, in the current study, most of the foreign mothers were Syrian. Even though the western part of our country is more similar to European countries, the eastern and southern regions share a similar cultural geography with Syria. Therefore, we interpreted that the birth rates of Syrian adolescent mothers could be similar to those of Turkish adolescent mothers. In addition, significant differences may not have been detected due to the limited sample size. Only 6% of the mothers in the cohort of this study were Syrian.

Adolescents' tendency to engage in risky behaviors negatively affects the newborn [2,4,6,25–28]. The health risk behaviors of adolescents are grouped into six categories: behaviors that contribute to unintentional injuries and violence; sexual behaviors that contribute to unintended pregnancies and sexually transmitted infections; alcohol and substance use; tobacco use; unhealthy dietary behaviors; and physical inactivity [29]. Adolescent pregnancy is largely a result of these behaviors. While the adolescent continues to grow and mature, she also has to experience the changes related to pregnancy. The adolescent's reserve for pregnancy is very low.

In concordance with the literature, the birth weight of infants of adolescent mothers was lower than that of infants of young adult mothers in the current study. The incidence of SGA was significantly increased in infants of adolescent mothers. However, early neonatal outcomes of adolescent mothers, including low Apgar scores, incidence of prematurity, frequency of admission to the neonatal intensive care unit, and mortality and morbidity rates, did not exhibit significant differences compared with infants of young adult mothers. The mortality rate of infants of adolescent and young adult mothers was also similar, and the deaths were associated with extreme prematurity. Adverse effects other than the low

birth weight and high incidence of SGA attributed to infants of adolescent mothers not demonstrated in our study may be due to the very limited number of early adolescents. In addition, the median ages of adolescent and young adult mothers were not far apart in our study. The median age of the adolescent group was 18 years. The youngest adolescent mother was 14 years old, and there was only one case at this age. The younger age of the early adolescent mother (10–14 years), who has just finished childhood, imposes more obvious risks for both the mother and the baby. Akseer et al. [25] compared adolescent and older mothers and their babies and observed that early adolescent mothers (10–14 years) had the highest rates of prematurity, SGA, low birth weight (LBW), and neonatal mortality.

They showed that these risks gradually decreased with increasing age and increased again in older mothers (over 40 years), forming a U-shaped trend. Other studies also reported parallel results [5,6].

This study has certain limitations. First, it is a single-center study; therefore, the number of early adolescents in the 10–14 age group, which is at higher risk for adolescent pregnancies, is very small. Secondly, the age range of the control group is narrow and close to that of the adolescent group.

Conclusion

Adolescent pregnancies constitute a global problem that negatively influences the lives of both the mother and the infant. Adolescent mothers, whose growth and maturation have not yet been completed, and their babies require special care. Awareness of the consequences of adolescent pregnancies should be increased, and adolescent pregnancies should be prevented for the health of the world's population in the future.

Ethics Committee Approval: The study was approved by Istanbul Medeniyet University Goztepe Education and Research Hospital Ethics Committee (No: 2023/0959, Date: 20.12.2023).

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